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BACKGROUND PAPER

ON

WHIS AND PROPOSED ON-ORBIT C³I NODE

BACKGROUND

- A manned military space platform in the 1996-2005 time-frame would enable man-in-the-loop control/manipulation of high data-rate exo-atmospheric cross-links (between various types of satellites) prior to transmission of information to users on earth. The atmosphere imposes a fundamental data-rate limit to the up and down link. Real-time processing and analysis of data in space can mitigate this problem. The need for man's presence focuses on nondeterministic discrimination, pattern recognition and prioritization of information.

SUPPORT

- Some existing space-based sensors are already limited by the data-rate of their down links. Various imagery options such as space-based radar (SBR) and hyperspectral approaches will generate additional high-rate data streams. Technology enabling high data-rate cross links in space (high GHz and superconducting terahertz technologies) will permit real-time data transfer and data handling on spaceborne platforms.
- Deterministic on-board processors will also enable data fusion and data reduction prior to down link transmission. Significant degrees of data fusion require judgements/decisions to determine the information that should be processed in real-time. A substantial degree of intelligence must be infused. In the near-term, it should include both knowledge-based systems and man's involvement. Man's involvement may make real-time interpretation of unplanned events feasible and enable the direction of this information directly to field commanders.
- Processing requirements increase exponentially as a determination is made of a target's location, velocity, classification and identification. If spotlight functions (optical and microwave) can be directed in real-time, useful data can be recovered on a single pass for transmission to a selected ground site. Such specialized treatment of the data does not preclude the full stream of data from continuing to earth at atmospheric compatible data-rates. Large-scale computations and further analysis for various applications could still occur on the ground.

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PROPOSAL

- The program could proceed from a communications package flown in 1990-1991, ground simulation and test of the knowledge-based processing scheme, to a primary payload test in 1993 with a sensor bank test set. A protocol of targets from geological objects to mobile objects should be assessed by comparing real-time man-in-the-loop control from space vs current ground based analysis.

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